Credit Name: CSE 2120 Data Structures 1
Assignment Name: Course Grades Mastery
How has your program changed from planning to coding to now? Please explain?

PLANNING:

I plan to create a Coursegrades class, and a secondary Gradebook class.
Gradebook: create a 2D array, and a Gradebook constructor method to store the value array values. The GetGrades method will prompt users for the 5 test grades for each of the 12 students. The ShowGrades method will display the test grades entered for each student. Testaverage method will calculate the average for one of the tests. Studentaverage method will calculate the average grade of a student.
CourseGrades: Create an object linking the Gradebook class to the main CourseGrades class. Prepare scanner. Call the get getgrades/showgrades methods so the user can input the grades and program can output the results. Prompt user which student's average they would like to see, then print the result using the studentaverage method. Prompt user to enter which test average they would like to see, and print the result using the testaverage method.

CODING:

CourseGrades Class

1.

```
//create an instance of Gradebook class
//Object studentgrades can be used to call
Gradebook studentgrades = new Gradebook();

//call GetGrades method, which prompts user
studentgrades.GetGrades();

//call ShowGrades method, which displays al
studentgrades.ShowGrades();

//prepare scanner for userinput
Scanner input = new Scanner(System.in);
```

Create a studentgrades object, linking the Gradebook class to the main CourseGrades class. Call the GetGrades method, aswell as the ShowGrades method. These methods from the Gradebook Class will prompt user for the grades of students, and print the grades of all the students.
Set scanner for user input.

2.

```
//prompt user to enter which student's average they want to see
System.out.println("Please Enter which student (1-12) average you want to see: ");

//user input is stored in variable called studentnumber
int studentnumber = input.nextInt();

//print the student's average by calling the studentaverage method from Gradebook c
System.out.println("Student " + studentnumber + "'s average is:"
+ studentgrades.studentaverage(studentnumber) + "%");
```

Prompt user for which student's average they would like to see, input value stored in studentnumber variable.
Print student's average using the studentaverage method, and the studentnumber is the parameter.

3.

```
//prompt user to enter which test's average they would like to see
System.out.println("Please enter the test (1-5) average you would like to see:");

//user input is stored in testnumber variable
int testnumber =  input.nextInt();

//print the test's average by calling the testaverage method from Gradebook class
System.out.println(" Test number " + testnumber + "'s average is:"
        + studentgrades.testaverage(testnumber) + "%");
```

Prompt user for which test average they would like to see, and store the value in testnumber.
Print test average using the testaverage method, and the testnumber is the parameter.

Gradebook Class

4.

```
//two dimensional array that stores th
private int[][] grades;

// Constructor method
//initialize the 2D grades array with
public Gradebook() {
    grades = new int[12][5];
}
```

Declared a two-dimensional array to store the 5 test scores for each of the 12 students.
Constructor method Gradebook to initialize the array.

5.

```
//method loops through each of the 12 students and asks user to enter the 5 t
// values are stored in the array
public void GetGrades() {
    Scanner input = new Scanner(System.in);
    for (int student = 0; student < grades.length; student++){
        System.out.println("Enter student " + (student +1) + "'s grades:");

    for (int test = 0; test < grades[student].length; test++) {
        System.out.println("  Test " + (test + 1) + ": ");
         grades[student][test] = input.nextInt();
    }
    }
    }
```

GetGrades method prompts for and stores grades.
Prepare scanner for user input.
The method iterates through the students in the array and prompts for each student's grades.
The method then iterates through each of the 5 tests per student, and prompts the user to enter the grade for each of the 5 tests.
The entered grades are stored in the corresponding position in the array.

6.

```
//method loops through the 5 test values for each student and pri
public void ShowGrades() {

    System.out.println("Gradebook:");
    for (int student = 0; student < grades.length; student++) {
        System.out.println("Student" + (student + 1) + ":");

    for (int test = 0; test < grades[student].length; test++) {
        System.out.println(grades[student][test] + "");
    }
    System.out.println("");
    }
}
```

ShowGrades method displays the grades for all of the students.
For loop iterates through all of the students in the array, printing the student numbers starting from 1. Second for loop iterates through each test for each student and prints the grade for each test.

7.

```java
//method used to calculate the average for a certain test 1-5.
public double testaverage(int testnum) {
    int testi = testnum -1;

    int sum = 0;

    for (int student = 0; student < grades.length; student++) {
        sum+= grades[student][testi];
    }
    return (double) sum / grades.length;
}
```

testaverage method calculates the average grade for a certain test.
Testi (test-index) changes the user input test number into the array index by subtracting by 1, because it starts from 0.
Initialized sum variable to store the sum of grades (12 total grades, 1 grade per student) for one specific test.
For loop iterates through all 12 students, adding the grades of that certain test into the sum variable.
Calculated average by dividing sum by the number of students.
Return type is double to print a decimal value.

8.

```java
// method calculates the average for a certain student, 1-12.
public double studentaverage(int studentnum) {
    int studenti = studentnum -1;

    int sum = 0;

    for (int test = 0; test < grades[studenti].length; test++) {
        sum+= grades[studenti][test];
    }
    return (double) sum / grades[studenti].length;
}
```

studentaverage method calculates the average grade for a student.
Studenti (student- index) changes the user input student number into the array index by subtracting by 1, because it starts from 0.
Initialized sum variable to store the sum of test grades for the specified student.
For loop iterates through each of the 5 tests for the specific student. The grades are added to the sum variable.
Calculated student average by dividing sum by the number of tests.
Return type is double to print a decimal value.

End of Program!